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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/663,163

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EXAMINER

TO, JENNIFER N

ART UNIT

PAPER NUMBER

2195

MAIL DATE

DELIVERY MODE

08/13/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/663,163	Applicant(s) BENNETT ET AL.	
	Examiner JENNIFER N. TO	Art Unit 2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 May 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-58 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-58 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/28/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-58 are pending for examination.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 30-49 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

4. Claims 30-49 are rejected under 35 U.S.C. 101 because the claimed invention are directed to apparatus claims, but appearing to be comprised of software alone without claiming associated computer hardware required for execution. For example, claims 30, 35, 41 recited resource determinator, resource optimizer, transition type determinator, VMM operation controller, notification receiver, and operation performer are all software modules/functions. Software alone is directed to a non-statutory subject matter.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 2195

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-58 are rejected under 35 U.S.C. 102(b) as being anticipated by Shorter (U.S. Patent No. 5063500).

7. Shorter was cited in the previous office action.

8. As per claim 1, Shorter teaches the invention as claim including method comprising:

identifying a predefined behavior of a virtual machine monitor (VMM) (VM Pool Manager) with respect to one or more virtual machines (VMs) (col. 11, lines 61-64); and
utilizing processor-managed resources associated with the one or more VMs based on the predefined behavior of the VMM (col. 11, line 64 through col. 12, line 63).

9. As per claim 2, Shorter teaches that wherein the predefined behavior of the VMM is any one of a first-time invocation of a VM, a subsequent invocation of a VM, a last invocation of a VM, and a modification of content of a virtual machine control structure (VMCS) associated with a VM (abstract; col. 5, lines 36-56).

10. As per claim 3, Shorter teaches that wherein identifying a predefined behavior of a VMM comprises receiving an indication of the predefined behavior from the VMM (col. 10, lines 52-55; col. 12, lines 20-21).

11. As per claim 4, Shorter teaches that wherein the indication is received via an instruction executed by the VMM (col. 10, lines 52-55; col. 12, lines 20-21).

12. As per claim 5, Shorter teaches that wherein the instruction executed by the VMM is any one of a VM launch instruction, a VM resume instruction, a virtual machine control structure (VMCS) access instruction, and a VMCS clear instruction (col. 10, lines 39-55; col. 11, lines 9-15).

13. As per claim 6, Shorter teaches that wherein identifying a predefined behavior of a VMM comprises determining the predefined behavior of the VMM by logic within a processor (abstract; col. 5, lines 36-55).

14. As per claim 7, Shorter teaches that wherein the logic within the processor is prediction logic (abstract; col. 5, lines 36-55).

15. As per claim 8, Shorter teaches that wherein utilization of processor-managed resources includes at least one of allocation of one or more processor-managed resources, de-allocation of one or more processor-managed resources, verification of data stored in one or more processor-managed resources, invalidation of data stored in one or more processor-managed resources, and loading of data into one or more processor-managed resources (abstract; col. 8, line 67 through col. 9, line 6).

Art Unit: 2195

16. As per claim 9, Shorter teaches the invention as claim including a method comprising:

determining that a transition from a virtual machine monitor (VMM) to a virtual machine (VM) is about to occur (abstract; col. 14, lines 47-59);

determining a type of the transition (abstract; col. 14, lines 47-66); and

notifying a processor of the type of the transition (abstract; col. 14, lines col. 14, lines 47-66).

17. As per claim 10, Shorter teaches that wherein notifying the processor comprises executing an instruction associated with the type of the transition (col. 14, lines 59-66).

18. As per claim 11, Shorter teaches that wherein the type of the transition is any one of an initial transfer to the VM and a subsequent transfer to the VM (col. 14, lines 47-66).

19. As per claim 12, Shorter teaches in response to determining that the transition is an initial transfer to the VM, allocating a memory region for a new virtual machine control structure (VMCS) associated with the VM, and requesting the processor to activate the new VMCS (col. 11, line 66 through col. 12, lines 22).

20. As per claim 13, Shorter teaches that wherein requesting the processor to activate the new VMCS comprises executing a VMCS pointer load instruction including a pointer to the new VMCS as an operand (col. 12, line 66 through col. 13, line 11).

21. As per claim 14, Shorter teaches that requesting the processor to initialize the new VMCS (col. 11, lines 9-18).

22. As per claim 15, Shorter teaches that wherein requesting the processor to initialize the new VMCS comprises executing a VMCS clear instruction including the pointer to the new VMCS as an operand (col. 8, line 59 through col. 9, line 26; col. 13, lines 12-20).

23. As per claim 16, Shorter teaches upon requesting the processor to activate the new VMCS, requesting the processor to set execution control information, VMM state information and VM state information in the new VMCS (col. 11, lines 9-18).

24. As per claim 17, Shorter teaches that wherein requesting the processor to set execution control information, VMM state information and VM state information in the new VMCS comprises executing a VMCS write instruction having an operand that identifies a component of the new VMCS to which data is to be written (figs 6A-6B, 7; col. 11, lines 9-18).

25. As per claim 18, Shorter teaches that in response to determining that the transition is a subsequent transfer to the VM, requesting the processor to update content of a virtual machine control structure (VMCS) (col. 12, lines 54-65).

26. As per claims 19-58, they are rejected for the same reason as claims 1-18 above.

Response to Arguments

27. Applicant's arguments filed 05/18/2008 have been fully considered but they are not persuasive.

28. In the remark, applicant argued that:

- (1) Claims 30-49 are directed to a statutory subject matter;
- (2) Shorter fails to teach identifying a predefined behavior of a virtual machine monitor with respect to one or more virtual machines;
- (3) Shorter fails to teach determining that a transition from a virtual machine monitor to a virtual machine is about to occur; and
- (4) Shorter fails to teach receiving a request to perform a transition from the VMM to a VM, the request indicating a type of transition, the type of transition being based on invocation information of the VM.

29. Examiner respectfully disagreed with applicant.

As to point (1), claims 30-49 recited an apparatus that comprising software module is subjected to a nonstatutory subject matter. According to MPEP 2106.01 [R5] (*Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works, and a compilation or mere arrangement of data. Both types of "descriptive material" are nonstatutory when claimed as descriptive material per se, 33 F.3d at 1360, 31 USPQ2d at 1759. When functional descriptive material is recorded on some computer-readable medium, it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare In re Lowry, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994)(discussing patentable weight of data structure limitations in the context of a statutory claim to a data structure stored on a computer readable medium that increases computer efficiency) and Warmerdam, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data*

structure per se held nonstatutory). Thus, claims 30-49 are directed to a non-statutory subject matter.

As to point (2), Shorter teaches the pool manager scanning its control block that represent VMs in the VM pool, compare whether the USER ID in the allocate matches the entries in the data structure (the entries in the data structure are the predefined behavior of the VMM), and by scanning itself, the pool manager (VMM) identifying a predefined behavior of itself with respect to one or more virtual machines (col. 11, lines 60-64). Thus, Shorter teaches identifying a predefined behavior of a VMM with respect to one or more virtual machines.

As to point (3), Shorter teaches under certain situation, the system has to switch between VMM and VMs. VMM and VM had to run serially. As the system is switching between VMM and VM, it needs to know whether VMM is switching into an existing VM or a new VM. VMM makes a determination how to invoke the virtual machine based upon the PRID and THRID, the VMM can determined what is the transition to the VM, first transition is to a new VM or subsequent transition to an existing VM (Shorter, claim 1, steps A-C). Thus, Shorter clearly teaches determining that a transition from a virtual machine monitor to a virtual machine is about to occur.

As to point (4), Shorter teaches receiving a request with a PRID and THRID, the VMM can determined what is the transition to the VM, first transition is to a new VM or

subsequent transition to an existing VM (Shorter, Claim 1). Thus the PRID and the THRID are the identifiers that indicating a type of transition. Therefore, Shorter clearly teaches receiving a request to perform a transition from the VMM to a VM, the request indicating a type of transition, the type of transition being based on invocation information of the VM.

Conclusion

30. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

31. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JENNIFER N. TO whose telephone number is (571)272-7212. The examiner can normally be reached on M-T 6AM- 3:30 PM, F 6AM- 2:30 PM.

Art Unit: 2195

32. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

33. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Meng-Ai An/
Supervisory Patent Examiner, Art Unit 2195

Jennifer N. To
Examiner
Art Unit 2195